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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/797,504	03/10/2004	Salman Akram	2269-5527US (99-0440.00/U)	3972
24247	7590	09/20/2005	EXAMINER LEE, HSIEN MING	
TRASK BRITT P.O. BOX 2550 SALT LAKE CITY, UT 84110			ART UNIT 2823	PAPER NUMBER

DATE MAILED: 09/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No.	Applicant(s)	
	10/797,504	AKRAM, SALMAN	
	Examiner	Art Unit	
	Hsien-ming Lee	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 25 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-77 is/are pending in the application.
- 4a) Of the above claim(s) 25-77 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12, 14, 15, 18-22 and 24 is/are rejected.
- 7) ☒ Claim(s) 13, 16, 17 and 23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

HSIEN-MING LEE
PRIMARY EXAMINER

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>031004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 2, 4, 8 and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Glenn et al. (US 6,399,463).

In re claim 1, Glenn et al. teach a method for singulating at least one semiconductor die from a semiconductor wafer, the method comprising:

- providing a semiconductor wafer 310 having a body including an active surface 310F and an opposing bottom surface 310B (Fig.3B);
- forming at least one trench 350 in the semiconductor wafer body 310 from the bottom surface 310B thereof in alignment with a plurality of streets 314A/314B on the active surface 310F circumscribing a location of at least one semiconductor die; and
- cutting through the semiconductor wafer body 310 with at least one laser beam 323 along the plurality of streets 314A between the active surface 310F of the semiconductor wafer body 310 and the at least one trench 314A.

In re claims 2 and 4, Glenn et al. teach etching the at least one trench with an anisotropic etch since the trench is a directional opening (Fig.3B).

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In re claim 8, Glenn et al. inherently teach forming at least one trench 350 to a width greater than a beam width of the at least one laser beam 323 (Fig.3B).

In re claim 18, Glenn et al. teach cutting from the bottom surface 310B of the semiconductor wafer body 310 along the at least one trench 350 (Fig.3B).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 7, 9, 12, 14, 15, 19-22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glenn et al in view of Manor (US 6,420,245).

In re claims 9, 14 and 21, Glenn et al. do not teach cutting the at least one trench with another laser beam or with a plurality of laser beam.

Manor, however, in an analogous art of singulating semiconductor dies, teach using a plurality of laser beam 302 and 702 to form a plurality of trench (Fig.7B).

Therefore, it would have been obvious to one of the ordinary skill in the art, at the time the invention was made, to combine Manor with Glenn et al. so that the semiconductor wafer of Glenn et al. can be singulated with the plurality of laser beam, since by this manner it would shorten processing time.

In re claims 15 and 22, Glenn et al in view of Manor teach using a plurality of laser beam for cutting a plurality of trench in a row perpendicular to a direction of travel.

In re claims 7, 12, 19 and 20, these claims are prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. In re Woodruff, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also In re Huang, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996) (claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also In re Boesch, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill of art) and In re Aller, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious).

In re claim 24, it would have been obvious to one of the ordinary skill in the art, at the time of the invention was made, to form a plurality of trenches respectively circumscribing locations of a plurality of semiconductor die, since by doing so it would completely scribe the entire wafer to form plural dies.

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Glenn et al in view of Swiss et al. (US 6,444,499).

Glenn et al. is silent as to using a wet etch or a dry etch for forming the trench.

However, using either wet etch or dry etch has been widely used in the art, as evidenced by Swiss et al., wherein trenches 456 and 458 are formed by a laser etch (i.e. a dry etch) or chemical etch (i.e. wet etch) (col. 10, lines 37-38).

Therefore, it would have been obvious to one of the ordinary skill in the art, at the time of the invention was made, to use either wet etch or dry etch, as taught by Swiss et al., in the

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method of Glenn et al. for singulation purpose, since either dry-etch or wet-etch is a good candidate for forming trench.

6. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glenn et al in view of Farnworth et al. (US 2005/0082651).

Glenn et al. do not teach reducing a thickness of the semiconductor wafer body prior to etching the at least one trench.

Farnworth et al., in an analogous art of singulation, teach reducing a thickness of the semiconductor wafer body by backgrinding (paragraph [0052]) prior to etching the at least one trench.

Therefore, it would have been obvious to one of the ordinary skill in the art, at the time of the invention was made, to reduce the thickness of the wafer body by backgrinding, as taught by Farnworth et al., prior to forming the trench of Glenn et al., since by this manner it would reduce the time and expense associated with the singulation (paragraph [0052], Farnworth et al.).

7. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glenn et al in view of Manor as applied to claim 9 above, and further in view of Farnworth et al. (US 2005/0082651).

Glenn et al. do not teach reducing a thickness of the semiconductor wafer body prior to etching the at least one trench.

Farnworth et al., in an analogous art of singulation, teach reducing a thickness of the semiconductor wafer body by backgrinding (paragraph [0052]) prior to etching the at least one trench.

Therefore, it would have been obvious to one of the ordinary skill in the art, at the time of the invention was made, to reduce the thickness of the wafer body by backgrinding, as taught by Farnworth et al., prior to forming the trench of Glenn et al., since by this manner it would reduce the time and expense associated with the singulation (paragraph [0052], Farnworth et al.).

Allowable Subject Matter

8. Claims 13, 16, 17 and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record at least neither teaches nor suggests traversing the at least another laser beam to impinge the semiconductor wafer body along a path and substantially concurrently traversing the at least one laser beam to impinge the semiconductor wafer body along the same path subsequent to impingement of the at least another laser beam (claim 13); cutting from the active surface of the semiconductor wafer body (claim 17).

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hsien-ming Lee whose telephone number is 571-272-1863. The examiner can normally be reached on Tuesday-Thursday (7:30 ~ 6:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sep. 15, 2005

Hsien-ming Lee
Primary Examiner
Art Unit 2823
HSIEN-MING LEE
PRIMARY EXAMINER